MIDDLE CREEK, LAKE COUNTY, CALIFORNIA
FLOOD DAMAGE REDUCTION AND ECOSYSTEM RESTORATION

FINAL INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT/ ENVIRONMENTAL IMPACT REPORT

September 2002
SCH #2000062024

US Army Corps of Engineers
Sacramento District
South Pacific Division

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Type of Statement. Final Integrated Feasibility Report and Environmental Impact Statement/Final Environmental Impact Report (FR/EIS/EIR).

Lead Federal Agency: U.S. Army Engineer District, Sacramento.

Lead State Agency: State of California Reclamation Board.

Abstract: The U.S. Army Corps of Engineers and Lake County, the non-Federal sponsor, propose to restore the Middle Creek flood plain to a natural wetland ecosystem and provide flood damage reduction to the study area, which is located between Highway 20 and Middle Creek immediately northwest of Clear Lake. The final FR/EIS/EIR describes the environmental resources in the Clear Lake area; evaluates the direct, indirect, and cumulative environmental effects of the recommended plan and three alternative plans; and recommends avoidance, minimization, and mitigation measures. Most potential adverse effects would either be short term and insignificant, or would be avoided or reduced to less-than significance using best management practices. Beneficial effects on vegetation, wildlife, fisheries, other resources, and the historic flood plain from the alternative plans are also discussed.

Public Review and Comment: The official closing date for receipt of comments on the draft FR/EIS/EIR was May 20, 2002. All comments received were considered and incorporated into the final FR/EIS/EIR, as appropriate. Requests for the final can be directed to the Corps at the following address: U.S. Army Engineer District, Sacramento, Attn: Mr. Jerry Fuentes, 1325 J Street, Sacramento, California 95814-2922. Mr. Fuentes can also be reached at (916) 557-6706 or email: jerry.w.fuentes@usace.army.mil.

SUMMARY

S.1 INTRODUCTION

S.1.1 Purpose and Need

This feasibility study has been undertaken to (1) define the environmental and flood problems in the Middle Creek area, (2) formulate and evaluate alternative plans for restoring environmental values and reducing flood damages in the area, and (3) determine the Federal interest in participating in the implementation of the recommended alternative plan. The study focuses on restoring portions of the flood plain to a natural wetland ecosystem and providing flood damage reduction to the study area. The results of the study are described in this integrated Feasibility Report and Environmental Impact Statement/Environmental Impact Report (FR/EIS/EIR).

S.1.2 Study Area

The Middle Creek area is located along the north shore of Clear Lake in Lake County, California (Plate S-1). The study area encompasses about 1,934 acres and generally consists of historic Robinson Lake, which is bounded on the east by State Highway 20 and on the west by Middle Creek, and separated from Clear Lake on the south by the Nice-Lucerne Cutoff Road. The town of Nice is less than 2 miles east, and the town of Lakeport is about 6 miles south of the study area. The Robinson Rancheria Tribe of Pomo Indians owns 65 acres west of State Highway 20 within the study area. Clear Lake is about 80 miles north of San Francisco.

S.1.3 Study Authority

This study was conducted under the authority of the Flood Control Act of 1962 (Public Law 87-874). This act reads, in part:

> The Secretary of the Army is hereby authorized and directed to cause surveys . . . to be made under the direction of the Chief of Engineers, in drainage areas of the United States . . ., which include the following named localities: Sacramento River Basin . . . .

Further, specific direction for this study was included in the House of Representatives Reports 104-149 and 104-679 accompanying the Energy and Water Development Appropriations Bills for fiscal years 1996 and 1997, which provide funding for:

> . . . the Corps of Engineers to . . . study . . . alternatives to restore the natural functions of the Middle Creek/Clear Lake ecosystem including the restoration of wetlands at the historic Robinson Lake.

S.2 PROBLEMS AND OPPORTUNITIES

S.2.1 Flooding and Flood Damage

Flood-related problems in the study area include potential damages from inundation to structures and extensive areas of agriculture from overflow from Rodman Slough. Prior to agricultural reclamation efforts, the study area was also part of Clear Lake. Although surrounded by levees, the study area remains at risk from flooding from both Clear Lake and Rodman Slough because of levee settlement. The majority of the study area is now included in the FEMA 100-year flood plain even though the Corps' Middle Creek Project was constructed in the 1960's to provide 100-year protection to the area.

S.2.2 Ecosystem Degradation

Considerable ecosystem degradation has taken place in the study area. Historically, the area was a portion of Clear Lake and consisted of tule marsh and open water. Shoreline wetlands served an important function to Clear Lake, providing fish and wildlife habitat, and trapping sediments. These wetlands were converted to agricultural fields during the last century. Problems associated with this degradation have increased over time. These problems include loss of natural habitat, loss of ecosystem function, and degraded water quality.

S.3 OBJECTIVES

The planning objectives were developed during several coordination meetings involving the Corps of Engineers, the Lake County Flood Control and Water Conservation District, and the State of California Department of Water Resources (DWR). The objectives were based on the problems and opportunities in the study area. A preliminary set of objectives was presented to the public at a workshop held on May 30, 1996, in Upper Lake in Lake County. After a review of the comments from the workshop, the Corps, District, U.S. Fish and Wildlife Service, and DWR held several additional meetings to further refine the objectives. These objectives are (1) reduce flood damages, and (2) restore fish and wildlife habitat.

S.4 MANAGEMENT MEASURES

The following management measures were evaluated during the feasibility phase of this study. These measures were either identified during the reconnaissance phase, were requested by the non-Federal sponsor, or were formulated by the Corps. These measures were identified as potentially contributing to the project objectives. The measures were (1) breach Middle Creek Project levees, (2) plant native vegetation, (3) create islands, (4) excavate sloughs, channels, and ponds, (5) construct new cross and ring levees, (6) relocate residents out of flood plain, and (7) reconstruct existing levees.

S.5 ALTERNATIVE PLANS

Based on the seven measures carried forward for further evaluation, five alternative plans were formulated. The five plans represent individual measures and combinations of measures, and show that ecological restoration of the historic Robinson Lake area and flood damage reduction can be accomplished. All of these alternative plans were formulated using the four Principles and Guidelines (P&G) screening criteria. Each action alternative meets the four criteria. A no action alternative is also included as a basis of comparison.

Based on discussions between the Corps and Lake County, the non-Federal sponsor, it was decided that the 100-year flood plain would be the largest scale plan to be considered. The sponsor preferred to limit the extent of the solution based on physical barriers and land use, and preliminary analyses also indicated that few ecosystem benefits could be derived from the area above the 100-year flood plain due to the lack of restoration opportunities and physical limitations.

S.5.1 No Action Alternative

Under the No Action alternative, the primary assumption is that no Federal flood damage reduction or ecosystem restoration project would be constructed. This alternative is the same as the future without-project condition that is used as a basis for comparison with action alternative plans. No action would be taken to restore the historic Robinson Lake wetlands in the study area under the No Action alternative. Existing resources including agriculture (1,691.5 acres), riparian (11 acres), wetland (70 acres), and upland (terrestrial flood plain habitat) (41.5 acres) habitats are expected to remain relatively unchanged. However, some resource degradation or losses due to wildfire, flood, erosion, disease, or future changes in agriculture drainage and levee maintenance practices are expected.

Wildlife and fish resources and habitat in the study area are expected to remain relatively unchanged. Farm practices would continue to restrict natural habitat to “fringe” vegetation along existing sloughs, irrigation ditches and ponds, levees, and the open water and tule marsh habitat south of Highline Slough. Clear Lake water quality is expected to continue to degrade from excessive nutrient loading. The flows and associated phosphorus loads would continue to empty directly into Clear Lake, causing algal blooms.

The Middle Creek Project levee along Rodman Slough would continue to require ongoing maintenance and repairs due to slumping, settlement, or overtopping south of the Bloody Island pumping station. Despite these actions, the levees would continue to provide only a 4-year level of flood protection and would not protect the area against the original design flood event. Portions of Highway 20 and the Nice-Lucerne Cutoff Road flood periodically and fall within the 100-year flood plain under future without-project conditions. These roads are anticipated to be inundated and closed during certain flood events.

S.5.2 Alternative 2

Alternative 2 encompasses about 1,650 acres, extending from the current shoreline of Clear Lake to the 100-year flood plain boundary. This alternative would restore the entire flood plain in the study area, with the exception of the Tribal lands adjacent to the study area. Alternative 2 was formulated to address both planning objectives. This alternative consists of measures 1 through 4 to address the fish and wildlife habitat restoration objective and measures 5 and 6 to meet the flood damage reduction objective. This alternative plan focuses on reconnecting the flood plain of Middle Creek to the historic Robinson Lake wetland area by breaching the existing levee system to create inlets that direct flows into the study area and providing flood damage reduction by relocating residents from the flood plain.

In order to accomplish this, a portion of the Middle Creek Project levee from the confluence of Scotts and Middle Creeks to Clear Lake would need to be deauthorized and breached. Channels and sloughs would also be constructed to direct creek flows from the breaches through the study area to Clear Lake. A ring levee would be constructed to provide an existing level of protection for the Tribal lands. Implementation of this alternative would result in 765 acres of wetlands, 230 acres of riparian, 405 acres of open water, and 250 acres of upland habitat.

This alternative would also require that all structures and personal property be removed from the study area. A total of 22 structures and associated infrastructure (septic tanks, plumbing, and electrical) would be demolished and removed from the project area. Wells would be abandoned and capped as required by County and State standards. Property owners would be compensated and relocated outside the flood plain. All current agricultural practices within the flood plain would be discontinued.

S.5.3 Alternative 3

Alternative 3 is similar to Alternative 2 except that it would restore a smaller area, extending from Clear Lake to the approximate location of a 1920's reclamation levee near Bloody Island (Plate 4). Alternative 3 was formulated to address both planning objectives. Alternatives 3 and 4 were formulated as smaller scale alternatives to Alternative 2. They were included in the analysis to reasonably maximize net monetary and non-monetary benefits.

Measures 1 through 6 were combined to create Alternative 3. This alternative also focuses on reconnecting the flood plain of Middle Creek to the historic Robinson Lake wetland area by breaching the existing levee system to create inlets that direct flows into the study area. Channels and sloughs would also be constructed to direct creek flows from the breaches through the study area to Clear Lake. As with Alternative 2, the portions of the Middle Creek Project levees to be breached would need to be deauthorized from the Bloody Island Pump Station to Clear Lake. To protect the northern area outside of the Alternative 3 boundary from flooding, a cross levee would be constructed from Highway 20 west along Reclamation Road to Bloody Island and from Bloody Island to the Middle Creek flood control levees along Rodman Slough.

A ring levee would also be constructed to provide the existing level of protection to the Tribal lands.

Alternative 3 would reduce flood damages by relocating existing structures out of the flood plain. Implementation of this alternative would result in 587 acres of wetlands, 158 acres of riparian, and 382 acres of open water.

S.5.4 Alternative 4

Alternative 4 is similar to Alternatives 2 and 3 except that it would restore a smaller area, extending from Clear Lake to the Reclamation Cutoff Road (Plate 5). Alternative 4 was formulated using a combination of measures 1 through 6. This alternative also focuses on reconnecting a portion of the flood plain of Middle Creek to the historic Robinson Lake wetland area by breaching the existing levee system to create inlets that direct flows into the study area. Channels and sloughs would also be constructed to direct creek flows from the breaches through the study area to Clear Lake. As with Alternative 2, the portions of the Middle Creek Project levees to be breached would need to be deauthorized from the Blood Island Pump Station to Clear Lake. To protect the northern area outside of the Alternative 4 boundary from flooding, a cross levee would be constructed from Highway 20 west to Rodman Slough. A ring levee would also be constructed to provide the existing level of protection to the Tribal lands.

Alternative 4 would reduce flood damages by relocating existing structures within the project area out of the flood plain. Implementation of this alternative would result in 439 acres of wetlands, 128 acres of riparian, and 323 acres of open water.

S.5.5 Alternative 5

Alternative 5 was formulated at the request of the State Reclamation Board, a cost-sharing partner for the study. This alternative would accomplish only one of the planning objectives: reduce flood damages. Alternative 5 consists of measures 4, 5, and 6. This is the nonstructural alternative for flood damage reduction.

This alternative would consist of purchasing the land that occupies the flood plain, compensating and relocating the current owners, and demolishing structures. Demolition of structures would include pavement, fencing, and utilities.

Wells would be abandoned and capped according to County and State regulations. Existing septic tanks and pumping stations would be removed. Reclamation Road and Reclamation Cut-Off Roads would be abandoned within the study area.

In addition, this alternative would require discontinuing maintenance and repair of the Middle Creek Project levee below the confluence of Scotts and Middle Creeks. A new ring levee identical to the one described under Alternative 2 would be constructed to maintain existing flood protection for the Tribal lands.

S.5.6 Alternative 6

Alternative 6 was also formulated at the request of the Reclamation Board. This alternative is the stand-alone measure 7 and would consist of reconstructing the Middle Creek Project levees below the confluence of Scotts and Middle Creeks to bring them up to their original design elevations. The land behind the levees would continue to be farmed. The existing residences would remain, and new ones could be constructed. This alternative would maintain the existing land uses and would not restore any habitat.

S.6 AFFECTED ENVIRONMENT

Environmental resources not evaluated in detail include climate; geology and seismicity; fisheries; noise; recreation; visual resources/esthetics; and hazardous, toxic, and radiological waste. Significant resources that may be affected by the alternatives include land use, topography and soils, vegetation and wildlife, special status species, water quality, air quality, public health, socioeconomics, traffic and circulation, and cultural resources.

S.7 ENVIRONMENTAL EFFECTS AND MITIGATION

Table S-1 summarizes the adverse and beneficial effects of the alternatives, potential mitigation measures, and significance before and after implementation of mitigation measures.

S.8 EVALUATION OF ALTERNATIVE PLANS

S.8.1 Alternative 2

Alternative 2 provides $285,000 in average annual National Economic Development (NED) benefits. The average annual costs for allocated flood damage reduction is $254,000, resulting in net NED benefits of $31,000 and a benefit-to-cost (B/C) ratio of 1.12. Alternative 2 produces 869 Average Annual Habitat Units with an incremental cost per unit of $702.

S.8.2 Alternative 3

Alternative 3 provides $218,000 in average annual NED benefits. The average annual costs for allocated flood damage reduction is $199,000, resulting in net NED benefits of $19,000 for a B/C ratio of 1.10. Alternative 3 produces 244 Average Annual Habitat Units with an incremental cost per unit of $5,111.

S.8.3 Alternative 4

Alternative 4 provides $253,000 in average annual NED benefits. The average annual costs for allocated flood damage reduction is $217,000, resulting in net NED benefits of $36,000 and a B/C ratio of 1.17. Alternative 4 produces 127 Average Annual Habitat Units with an incremental cost per unit of $11,409.

Table S-1

S.8.4 Alternative 5

The average annual NED benefits for Alternative 5 are $285,000. The annualized costs for Alternative 5 are $2,493,000, resulting in a B/C ratio of only 0.1. Since this ratio is less than 1.0, the alternative is economically infeasible (not cost effective). In addition, this alternative does not meet the planning objective to restore fish and wildlife habitat, and does not meet the P&G screening criteria for completeness, effectiveness, and efficiency. Therefore, this alternative was not carried forward for further evaluation.

S.8.5 Alternative 6

The average annual NED benefits for Alternative 6 were determined to be $465,000. No detailed cost estimates were developed for this alternative. However, preliminary estimates were developed during the early stages of the feasibility study. These estimates indicated that the average annual costs of rehabilitating the levee system would be about $2,540,000, with a resulting B/C of 0.18. Since this ratio is less than 1.0, the alternative is economically infeasible (not cost effective). In addition, this alternative does not meet the planning objective to restore fish and wildlife habitat, and does not meet the P&G screening criteria for completeness, effectiveness, and efficiency. Therefore, this alternative was not carried forward for further evaluation.

S.9 COMBINED NED/NER PLAN

The combined NED/National Economic Restoration (NER) Plan is Alternative 2 since it maximizes total NED and NER benefits over total project costs. The natural Middle Creek flood plain would be restored by breaching the Middle Creek Project levee in several locations to create multiple connections to Rodman Slough. The Middle Creek Project levee from the confluence of Middle and Scotts Creeks to Clear Lake would be deauthorized as a flood control structure. These breaches would be 200 feet wide and deep enough to permit fish passage during periods of low lake levels in Clear Lake. Sideslopes would be 3H:1V. The sides and bottom of each breach would be riprapped to prevent erosion. Three additional interior breaches would also be constructed to allow flows through the restored wetlands.

A ring levee would be constructed to provide adjacent Tribal lands with the existing level of flood protection. This levee would have a geogrid base and would require a layback berm on both sides of the levee for stability. A drainage pipe with a flap gate would be placed in the ring levee to provide drainage from the Tribal lands. The ring levee would be approximately 3,700 feet in length and roughly 17 feet high depending on ground elevation. A pump station would be constructed to provide drainage.

Channels and sloughs would also be constructed to direct creek flows from the breaches through the study area to Clear Lake. Dimensions of the channels are 100 feet wide and a maximum of 6 feet deep. The lower portion of Hammond Slough would also be restored to provide a hydrologic connection with Clear Lake. The remainder of Hammond Slough would be realigned to avoid the ring levee around the Tribal lands.

Material generated from grading the levee breaches, and excavating channels and sloughs would be used to create islands to direct water flows and to create additional upland/riparian habitat. Portions of the interior levees no longer used for flood damage reduction would be preserved as islands.

A new bridge on Nice-Lucerne Cut-Off Road would be constructed due east of Rodman Slough. The new bridge would be 350 feet long and would be located 750 feet east of the present bridge. This new bridge would span the restored mouth of Hammond Slough, allowing water to flow to Clear Lake.

Plantings would take place in critical areas to protect newly constructed areas from erosion (breached levee areas) and in selected areas that would facilitate restoration, encourage species diversity, and discourage the invasion of weedy species. The planting program for these critical areas would include dense planting, a variety of appropriate native species, and planting installation methods including pole cuttings, container stock, and direct seeding. The planting program would focus on establishing species that provide important habitat for wildlife, but are not abundant in the surrounding habitats, may not readily establish naturally, or may be out-competed by a dominant species during the initial habitat establishment (Oregon ash, box elder, Mexican blue elderberry, and common tule). Selective removal of some orchard trees would be accomplished with plantings of oak trees.

This alternative would also require that all structures and personal property be removed from the study area. A total of 22 structures and associated infrastructure (septic tanks, plumbing, and electrical) would be demolished and removed from the project area. Wells would be abandoned and capped as required by County and State standards. Property owners and residents would be compensated for property and the costs of relocating from the flood plain. All current agricultural practices within the flood plain would be discontinued.

S.10 ISSUES OF KNOWN CONTROVERSY

There are no issues of known controversy at this time.

S.11 UNRESOLVED ISSUES

There are three unresolved issues at this time. First, the draft U.S. Fish and Wildlife Service (FWS) Coordination Act Report (CAR) will be finalized after completion of special status species consultation with the FWS Endangered Species Office. The recommendations in the draft CAR are not expected to change.

Second, informal consultation with the FWS regarding special status species is ongoing; a biological assessment will be prepared and submitted to the FWS, asking for their review and concurrence with a determination of not likely to affect any special status species. If the FWS does not concur with this assessment, the Corps will initiate formal consultation.

The third issue is the disposition of tribal trust lands. The Robinson Rancheria Tribe of Pomo Indians owns 30 acres within the 100-year flood plain in the project area west of the State Highway 20. The Tribe has indicated a willingness to support the project through Tribal Resolution No. 8-17-02 A. The Tribe's approval and acceptance of the project is contingent on the acceptable resolution of the Tribal lands issues. The Tribal lands within the project area are held in pre-1988 trust. The Tribe is currently evaluating a number of options for the disposition of these lands. Some of these options include transferring the trust to another parcel, retaining trust status and developing the parcel, or allowing a flowage easement across the property. Since Alternative 2 performs and meets the criteria for both NED and NER and is fully justified both with and without the inclusion of the Tribal lands, the Corps has decided to proceed without including the lands. The opportunity exists in the future to include the Tribal lands should the issue be resolved. At that time, additional documentation including an environmental review would take place.

S.12 PUBLIC AND AGENCY REVIEW

The draft FR/EIS/EIR was circulated for agency and public review for 45 days. During the review period, a public meeting was held to obtain comments from the public, agencies, and other interested parties. After completion of the public review period, all comments received were considered and incorporated into the final FR/EIS/EIR, as appropriate. Responses to public comments are included in the final document as Appendix K. The State lead agency may then certify that the final EIR was prepared in compliance with the California Environmental Quality Act. The final report describes the purpose, scope, and public acceptability of the selected plan and identifies the Federal and non-Federal responsibilities for proceeding with the plan.

As required by the National Environmental Policy Act, the South Pacific Division (SPD) Engineer will issue a notice of completion of the final report, submit the report to Corps Headquarters, and file the report with the U.S. Environmental Protection Agency. The Division Engineer's notice of completion will be published in the *Federal Register*, starting a 30-day public review period. The Corps' Headquarters will coordinate the public comments, receive comments from affected Federal and State agencies, and complete its own independent review of the final report.

After its review of the final FR/EIS/EIR, including consideration of public comments, Corps Headquarters will prepare the Chief of Engineer's Report. This report will be submitted to the Assistant Secretary of the Army for Civil Works, who will coordinate with the Office of Management and Budget and submit the report to Congress.

Assuming that the non-Federal sponsor is willing to cost-share the project, detailed engineering studies and design efforts for the selected plan would be initiated. A project management plan outlining Federal and non-Federal obligations, requirements, tasks, costs, and schedule from preconstruction engineering and design, through construction would also be prepared.

Plate S-1

CONTENTS

Note to reader: The Feasibility Report and Environmental Impact Statement/Report for this study have been integrated into one document designed to meet both Corps planning and environmental requirements. Sections noted in the contents by an asterisk (*) are listed in the Council of Environmental Quality's Regulations for Implementing the National Environmental Policy Act (40 CFR 1502.10).

TABLES

PLATES

APPENDIXES

A. Engineering Appendix
B. Correspondence with Natural Resources Conservation Service
C. FWS Draft Coordination Act Report
D. Correspondence with FWS Regarding Threatened and Endangered Species
E. Correspondence with State Historic Preservation Officer
F. Economic Analysis
G. Cost Effectiveness and Incremental Cost Analysis
H. Real Estate Plan
I. Letter of Support and Intent from the Non-Federal Sponsor
J. Monitoring and Adaptive Management Plan
K. Comments and Responses

ACRONYMS AND ABBREVIATIONS

AAHU	annual average habitat unit
APE	area of potential effects
Caltrans	California Department of Transportation
CAR	Coordination Act Report
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
Corps	Corps of Engineers
CWA	Clean Water Act
dBA	decibel
^{o} F	degrees Fahrenheit
DFG	California Department of Fish and Game
DWR	California Department of Water Resources
EIS/EIR	Environmental Impact Statement/Environmental Impact Report
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FR	Feasibility Report
FWS	Fish and Wildlife Service
HEP	Habitat Evaluation Procedure
HU	habitat unit
HTRW	hazardous, toxic, and radiological waste
LCAQMD	Lake County Air Quality Management District
LCVCD	Lake County Vector Control District
MCACES	Microcomputer Aided Cost Estimating System
MOA	memorandum of agreement
mph	miles per hour
NAAQS	National ambient air quality standards
NCRS	Natural Resources Conservation Service
NED	National Economic Development
NEPA	National Environmental Policy Act
NER	National Ecosystem Restoration
NGVD	National Geodetic Vertical Datum
NOx	nitrogen oxides
O&M	operation and maintenance
OMRR&R	operation, maintenance, repair, rehabilitation, and replacement
PCA	Project Cooperation Agreement
PCB	polychlorinated bi-phenol
PED	preconstruction engineering and design
P&G	principles and guidelines
PG&E	Pacific Gas and Electric Company
P.L.	Public Law
PM_{10}	particulate matter

ppm	parts per million
ROG	reactive organic gases
RWQCB	Regional Water Quality Control Board
SHPO	State Historic Preservation Officer
SOx	sulfur oxides
SPD	South Pacific Division
SRA	shaded riverine aquatic
State	State of California
TMDL	total maximum daily load
$\mu g/m^3$	micrograms per cubic meter
WRCB	Water Resources Control Board